Relationship between Entrepreneurial Indicators among Innovation-Driven Economies and Its Implications for Japan

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Abstract

This study surveys the relationship between entrepreneurial indicators among innovation-driven economies and its implications for Japan. This study surveys specifically the relationship between Total Entrepreneurial Activity (TEA), which is a key indicator, and other indicators. The results reveal a strong correlation between TEA and the following indicators: perceived capabilities, entrepreneurial intention, know startup entrepreneur rate, media attention, informal investors' ratio, and discontinuity of business. Weak correlations exist between TEA and the following indicators: perceived opportunities, fear of failure, high status successful entrepreneurship, and entrepreneurship as desirable career. With the exception of perceived capabilities, entrepreneurship related indicators' contribution to TEA is not efficient in Japan. More efficient utilization of entrepreneurial intention, entrepreneurial network, media attention, and informal investors' activity could contribute to increasing Japan's TEA and activating entrepreneurial activity.

Keywords: entrepreneurship, startups, international comparison
JEL classification: L26, M13

1. Introduction

Based on Hoshino (2013), which utilizes data from the global entrepreneurship monitor (GEM) to survey Japan's entrepreneurship characteristics in comparison to other innovation-driven economies, this study examines the relationship between entrepreneurial indicators among innovation-driven economies, utilizing the GEM. Specifically, this study reports the correlation coefficient between TEA, which is the most general indicator of entrepreneurial activity[1], and other indicators of each survey year and the mean of the survey years. This study also graphically presents the relationship between TEA and other indicators, utilizing the mean of the survey years[2] and considers its implications for Japan.

2. Data

The study uses data from the GEM, which is the world's largest study of entrepreneurial dynamics[3]. The GEM has grown into an association of more than 400 researchers from approximately 100 economies during its 14 year history. The 2012 GEM comprised 69 economies[4]. The GEM database provides internationally comparable data beginning in 2001. This database is available free at http://www.gemconsortium.org/data and provides important international public information. The database indicators encom-

1 Takahashi et al. (2013).

2 I have followed Isobe and Yahagi (2011) for its method of graphical presentation and correlation coefficient table presentation.

3 GEM (2013).

4 Xavier et al., *Global Entrepreneurship Monitor 2012 Global Report* (2012).

pass entrepreneurship activity, attitudes, and aspirations[5]. The present study focuses on 32 economies identified as innovation-driven economies[6], which are updated based on a list in Isobe and Yahagi (2011) because many experts (e.g., Venture Enterprise Center, 2010) have expressed the opinion that international comparison is needed among economies in the same general stage of economic development.

3. Description of TEA

Total entrepreneurial activity (TEA) is a key indicator signifying the level of entrepreneurial activity by the percentage of the population aged 18-64 that are either a nascent entrepreneur or owner-manager of a new business.

4. Relationship between TEA and Attitude Related Indicators

4-1. Relationship between TEA and Perceived Opportunities

Perceived opportunities signify the percentage of the population aged 18-64 that identify good opportunities to start a firm in their locality. Table 1 reports that the correlation coefficient is statistically significant[7] neither in 50% of the survey years nor in the mean of the survey years. This result is

5 All the data sourced from the GEM Database were accessed and downloaded from the GEM homepage in July 2013.

6 GEM classifies economies into three groups by stage of development: factor-driven, efficiency-driven, and innovation-driven, each in sequence representing a more advanced stage.

7 To determine statistical significance, I have referred to Hoel (1976, 1984) and Siegle (2013).

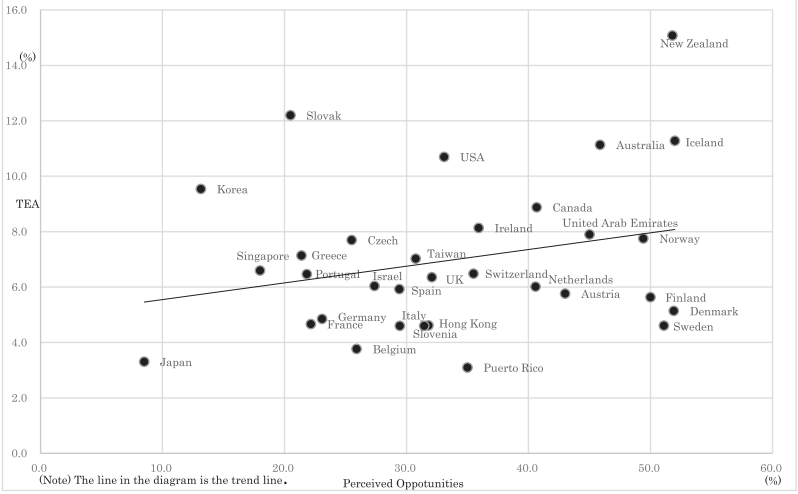
not consistent with the previous literature. For example, Isobe and Takahashi (2007) report that preceding GEM surveys have revealed a close relationship between perceived opportunities and entrepreneurship. Takahashi et al. (2013), utilizing large scale microdata of 2001-2010, report that the TEA of a group with perceived opportunities is higher than that of a group without perceived opportunities in the US, France, Italy, UK Germany, and Japan. I acknowledge that for these six economies, Takahashi et al.'s (2013) results are more convincing because their result is based on the population that perceives opportunities and their sample size is much larger

Table 1 Correlation Coefficient between TEA and Perceived Opportunities

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean
0.25	0.33	**0.59**	**0.64**	**0.44**	**0.43**	**0.44**	0.06	**0.67**	0.33	-0.05	0.12	0.26

(Note) Boldface means the correlation coefficient is statistically significant at the 5% level. Despite the negative figure in 2011, I have used a one sided test, based on the assumption that the alternative to zero correlation would be the positive correlation. Even if a two sided test is used, the same figures would be statistically significant.

Figure 1 Relationship between TEA and Perceived Opportunities among Innovation-Driven Economies in the Mean of 2001–2012



(Note) The line in the diagram is the trend line.

than that of this study. Figure 1 depicts the relationship between TEA and perceived opportunities, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan's figure lies below the trend line, suggesting that perceived opportunities are not efficiently utilized to contribute to entrepreneurial activity.

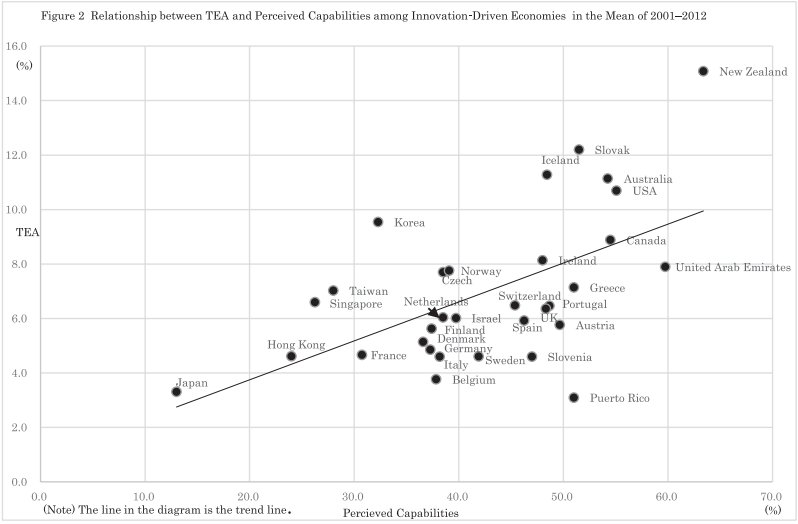
4-2. **Relationship between TEA and Perceived Capabilities**

Perceived capabilities represent the percentage of the population aged 18-64 who believe they have the required skills and knowledge to start a business. Table 2 reports that the correlation coefficient is statistically significant in 75% of the survey years and in the mean of the survey years. This result is consistent with the previous literature. For example, Isobe and Yahagi (2011) report that perceived capabilities are very important for entrepreneurs. Takahashi et al. (2013), utilizing large scale 2001-2010 microdata, report that the TEA of a group with perceived capabilities is higher than that of a group without perceived opportunities in the US, France, Italy, UK, Germany, and Japan. Figure 2 presents relationship between TEA and perceived capabilities, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan's figure lies just above the trend line, suggesting that perceived capabilities are efficiently utilized to contribute to entrepreneurial activity.

Table 2 Correlation Coefficient between TEA and Perceived Capabilities

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean
0.65	**0.60**	**0.82**	**0.73**	**0.67**	**0.56**	0.22	**0.50**	**0.76**	0.17	0.34	**0.43**	**0.57**

(Note) Boldface means the correlation coefficient is statistically significant at the 5% level.



4-3. **Relationship between TEA and Fear of Failure Rate**

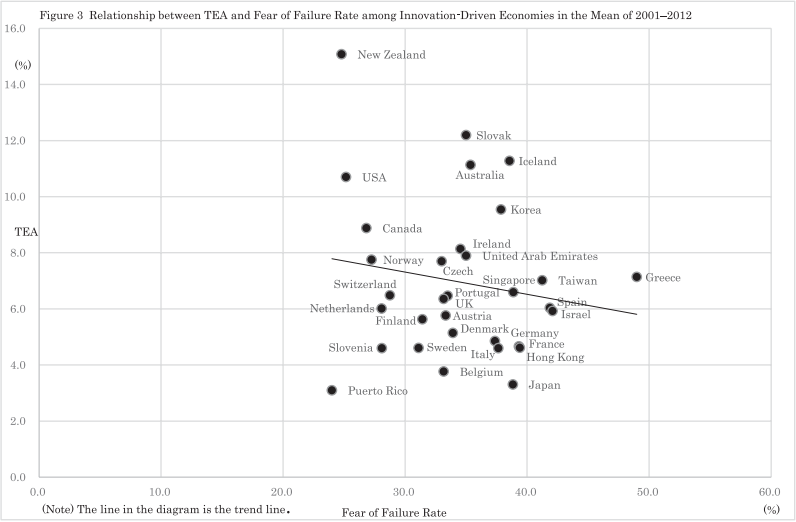
The fear of failure rate signifies the percentage of the population aged 18-64 with positive perceived opportunities who indicate that fear of failure would prevent them from starting a business. Table 3 reports that the correlation coefficient is statistically significant neither in 75% of the survey years nor in the mean of the survey years. This result is not consistent with the previous literature. For example, Takahashi et al. (2013), utilizing large scale microdata of 2001-2010, reports that the TEA of a group with fear of failure is lower than that of a group without fear of failure in the US, France, Italy, UK, Germany, and Japan. I acknowledge that for these six economies, Takahashi et al.'s (2013) results are more convincing for the aforementioned reason. Figure 3 depicts the relationship between TEA and fear of failure, utilizing the mean of the survey years. The trend line indicates a negative correlation. Japan's figure lies below the trend line, suggesting that

given the level of fear of failure, Japan's entrepreneurial activity is stagnant. For example, although Hong Kong's fear of failure rate is a bit higher than that of Japan, its TEA is higher than Japan's. Thus, fear of failure could be a sufficient obstacle for entrepreneurial activity in Japan.

Table 3 Correlation Coefficient between TEA and Fear of Failure

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean
0.10	0.12	-0.26	-0.11	**-0.44**	-0.02	0.07	-0.31	**-0.39**	-0.05	-0.23	**-0.39**	-0.17

(Note) Boldface means the correlation coefficient is statistically significant at the 5% level. Despite positive figures in 2001, 2002, and 2007, I have used a one sided test, based on the assumption that the alternative to zero correlation would be a negative correlation. If a two sided test is used, only the 2005 figure would be statistically significant.



4-4. **Relationship between TEA and Entrepreneurial Intention**

Entrepreneurial intention signifies the percentage of the population aged 18-64 (excluding individuals involved in any stage of entrepreneurial

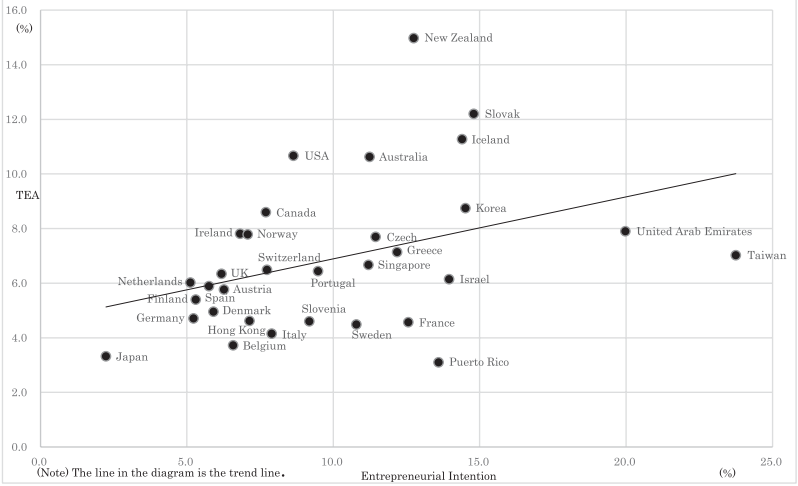
activity) that intend to start a business within three years. Table 4 reports that the correlation coefficient is statistically significant in 82% of the survey years and in the mean of the survey years. This result is consistent with the previous literature. For example, Xavier et al. (2012) describe entrepreneurial intention as a precedent phase of TEA. Figure 4 depicts the relationship between TEA and entrepreneurial intention, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan's figure lies below the trend line, suggesting that entrepreneurial intentions are not efficiently utilized to contribute to entrepreneurial activity.

Table 4 Correlation Coefficient between TEA and Entrepreneurial Intention

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean
0.63	**0.62**	**0.62**	**0.45**	**0.40**	0.25	**0.50**	**0.74**	**0.52**	**0.40**	0.27	**0.38**

(Note) Boldface means the correlation coefficient is statistically significant at the 5% level.

Figure 4 Relationship between TEA and Entrepreneurial Intention among Innovation-Driven Economies in the Mean of 2002–2012



(Note) The line in the diagram is the trend line.

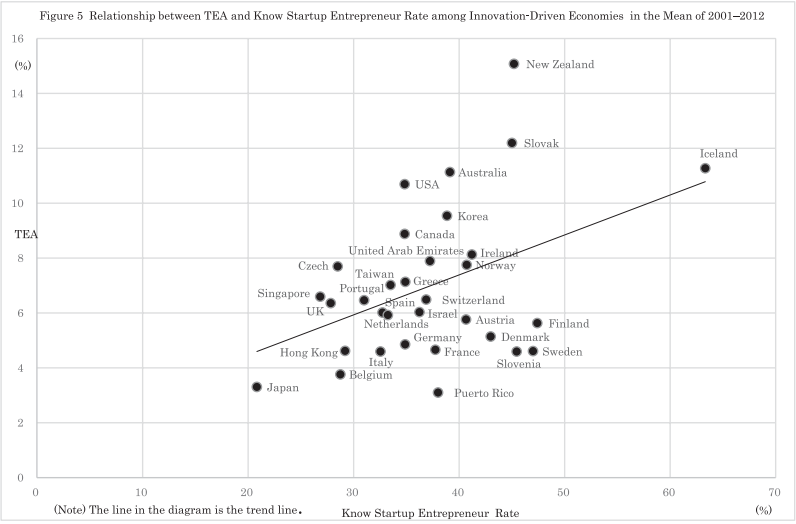
4-5. Relationship between TEA and the Know Startup Entrepreneur Rate

The rate of knowing a startup entrepreneur signifies the percentage of the population aged 18-64 that personally know someone who started a business in the preceding two years. This rate reflects the level of the entrepreneur network[8]. Table 5 reports that the correlation coefficient is statistically significant in 58% of the survey years and in the mean of the survey years. This result is consistent with the previous literature. For exam-

Table 5 Correlation Coefficient between TEA and Know Startup Entrepreneur Rate

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean
0.61	**0.57**	**0.50**	**0.46**	**0.36**	0.30	0.26	**0.45**	**0.58**	0.32	0.14	0.33	**0.42**

(Note) Boldface means the correlation coefficient is statistically significant at the 5% level.



8 Isobe and Yahagi (2011)

ple, Takahashi et al. (2013), utilizing large scale microdata 2001-2010, reports that the TEA of a group that personally knows someone who started a business in the preceding two years is higher than that of a group that does not know such a person in the US, France, Italy, UK, Germany, and Japan. Figure 5 depicts the relationship between TEA and know startup entrepreneur rate, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan's figure lies below the trend line, suggesting that the entrepreneurial network level does not efficiently contribute to entrepreneurial activity.

4-6. Relationship between TEA and High Status Successful Entrepreneurship

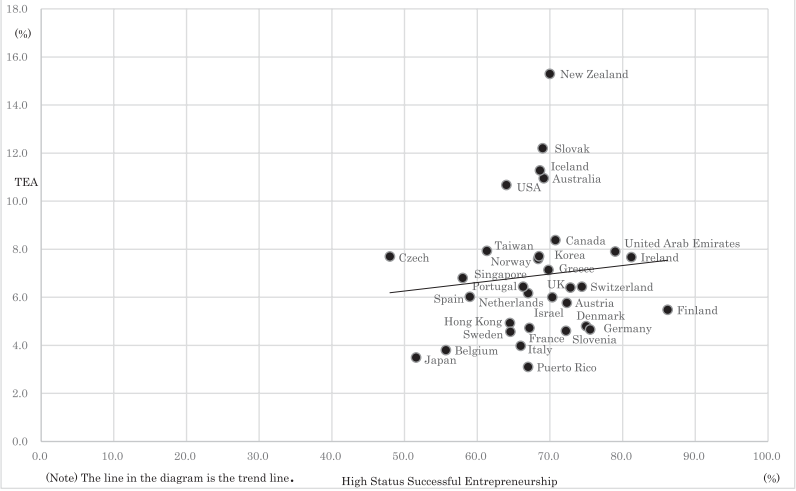
A perceived high status of successful entrepreneurship signifies the percentage of the population aged 18-64 who agree with the statement that in their country, successful entrepreneurs enjoy high status. Table 6 reports that the correlation coefficient is statistically significant neither in any survey year nor in the mean of the survey years. Previous researches have not addressed this correlation among innovation-driven economies. Figure 6 depicts the relationship between TEA and high status successful entrepreneurship, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan's figure lies below the trend line, suggesting that the perception of a high status of successful entrepreneurship does not efficiently contribute to entrepreneurial activity. In other words, given the level of perceived high status of successful entrepreneurship, Japan's entrepreneurial activity is stagnant. For example, although the Czech Republic's level of perceived high status of successful entrepreneurship is lower than that of Japan, its TEA is much higher than Japan's.

Table 6 Correlation Coefficient between TEA and High Status Successful Entrepreneurship

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean
0.18	0.10	0.27	0.01	0.16	0.30	0.25	0.06	-0.09	0.08	0.10

(Note) Since boldface means the correlation coefficient is statistically significant at the 5% level, no figure is statistically significant.

Figure 6 Relationship between TEA and High Status Successful Entrepreneurship among Innovation-Driven Economies in the Mean of 2003–2012



(Note) The line in the diagram is the trend line.

4-7. Relationship between TEA and Entrepreneurship as Desirable Career

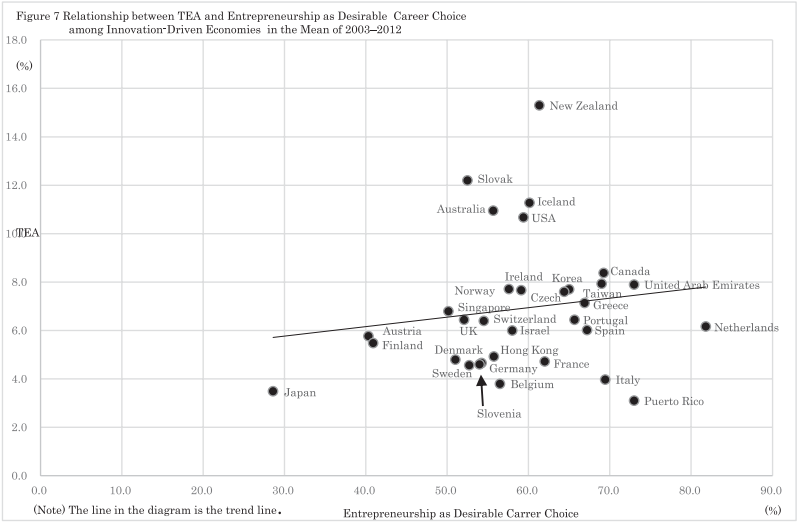
The perception of entrepreneurship as a desirable career choice signifies the percentage of the population aged 18-64 who agree with the statement that in their country, most people consider starting a business as a desirable career choice. Table 7 reports that the correlation coefficient is statistically significant neither in 80% of the survey years nor in the mean of the survey years. Previous researches have not addressed this correlation

among innovation-driven economies. Figure 7 depicts the relationship between TEA and entrepreneurship as desirable career, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan's figure lies below the trend line, suggesting that perceiving entrepreneurship as a desirable career does not efficiently contribute to entrepreneurial activity. That is, given the level of Entrepreneurship as Desirable Career, Japan's entrepreneurial activity is stagnant.

Table 7 Correlation Coefficient between TEA and Entrepreneurship as Desirable Career

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean
0.24	0.20	**0.36**	0.24	0.27	0.30	**0.45**	0.12	0.13	0.11	0.15

(Note) Boldface means the correlation coefficient is statistically significant at the 5% level.



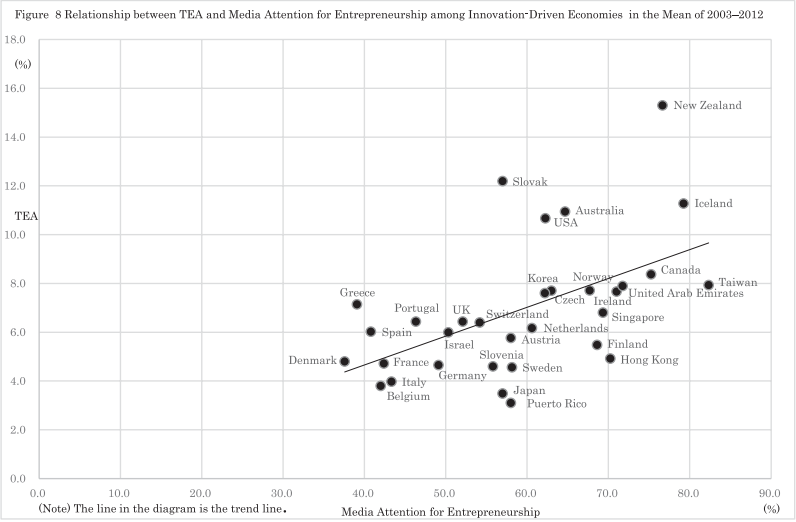
4-8. Relationship between TEA and Media Attention for Entrepreneurship

Media attention for entrepreneurship signifies the percentage of the population aged 18-64 who agree with the statement that in their country, one often sees stories in the media about successful new businesses. Table 8 reports that the correlation coefficient is statistically significant in 90% of the survey years and in the mean of the survey years. Previous researches have not addressed this correlation among innovation-driven economies. Figure 8 depicts the relationship between TEA and media attention for en-

Table 8 Correlation Coefficient between TEA and Media Attention for Entrepreneurship

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean
0.46	**0.48**	**0.61**	**0.37**	**0.50**	**0.75**	**0.47**	**0.69**	0.20	**0.41**	**0.53**

(Note) Boldface means the correlation coefficient is statistically significant at the 5% level.



trepreneurship, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan's figure lies below the trend line, suggesting that media attention for entrepreneurship does not efficiently contribute to entrepreneurial activity. In other words, given the level of media attention for entrepreneurship, Japan's entrepreneurial activity is stagnant.

5. Relationship between TEA and Activity Related Indicators

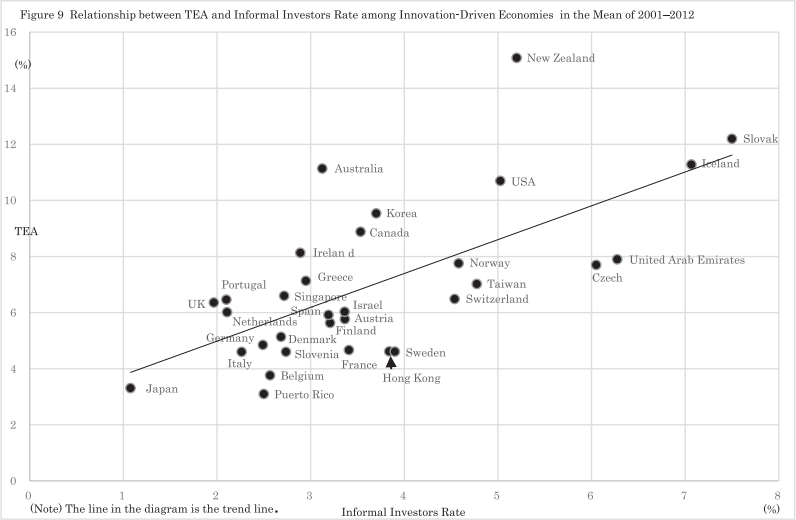
5-1. Informal Investors Rate

The informal investors rate signifies the percentage of the population aged 18-64 that have personally provided funds for a new business started by someone else in the preceding three years. Table 9 reports that the correlation coefficient is statistically significant in 92% of the survey years and in the mean of the survey years, suggesting that funds availability could contribute to entrepreneurial activity. This result is consistent with the previous literature. For example, Isobe and Yahagi (2011) find a strong positive correlation between TEA and the informal investors rate. Figure 9 depicts the relationship between TEA and informal investors rate, utilizing the mean of the survey years. The trend line indicates positive correlation. Japan's figure lies below the trend line, suggesting that informal investors' activity does

Table 9 Correlation Coefficient between TEA and Informal Investors Rate

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean
0.69	**0.68**	**0.70**	**0.70**	**0.66**	**0.60**	**0.66**	**0.69**	**0.82**	**0.50**	0.33	**0.58**	**0.66**

(Note) Boldface means the correlation coefficient is statistically significant at the 5% level.



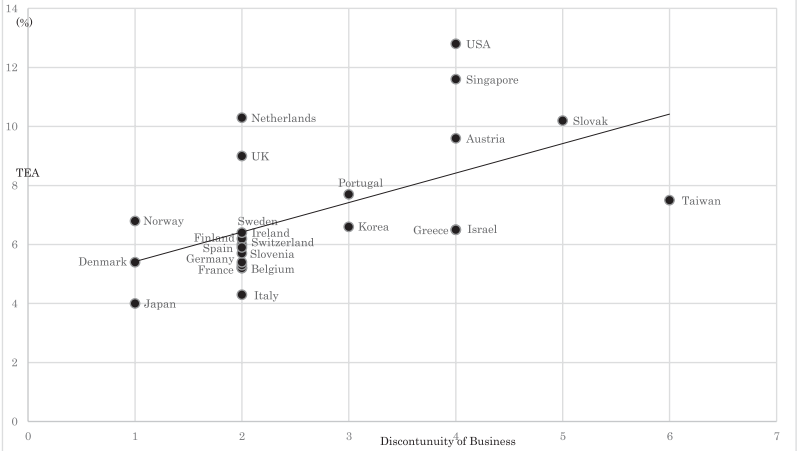
not efficiently contribute to entrepreneurial activity[9].

5-2. **Discontinuity of Business**

Figure 10 depicts the relationship between TEA and discontinuity of business in 2012. The correlation coefficient is 0.56, which is statistically significant at the 5% level, suggesting that more active entrepreneurial activity tends to cause more discontinuity of business. This result is consistent with the previous literature. For example, Honjo (2010) finds a tendency for industries experiencing active entrepreneurial activity to have many business discontinuities. The trend line indicates positive correlation. Japan's figure lies below the trend line, suggesting that given the rate of business discontinuity, Japan's entrepreneurial activity is stagnant.

9 Isobe and Yahagi (2011)

Figure 10 Relationship between TEA and Discontinuity of Business among Innovation-Driven Economies in 2012



(Note) The line in the diagram is the trend line. Fgures for Greece and Israel and those for France and Belgium are exaclly the same.

6. Summaryand Conclusions

Table 10 summarizes the statistical significance of the correlation coefficient between TEA and other entrepreneurial related indicators.

Table 10 Summary of Statistical Significance of Correlation Coefficient between TEA and Other Entrepreneurial Related Indicators

Indicators	% of statistical significance of the survey years	Statistical significance of the mean of the all survey years
Attitude Related Indicators		
Perceived Opportunities	50%	No
Perceived Capabilities	75%	Yes
Fear of Failure	25%	No
Entrepreneurial Intention	82%	Yes
Know Startup Entrepreneur Rate	58%	Yes
High Status Successful Entrepreneurship	0%	No
Entrepreneurship as Desirable Career	20%	No
Media Attention for Entrepreneurship	90%	Yes
Activity Related Indicators		
Informal Investors Ratio	92%	Yes
Discontinuity of Business	Yes (Data is available in 2012 only.)	

A strong correlation exists between TEA and the following indicators: perceived capabilities, entrepreneurial intention, know startup entrepreneur rate, media attention informal investors' ratio, and discontinuity of business. A weak correlation exists between TEA and the following indicators: perceived opportunities, fear of failure, high status successful entrepreneurship, and entrepreneurship as desirable career.

Table 11 **Summary of Entrepreneurship Related Indicators' Contribution to Japan's TEA**

Indicators	Contribution to TEA
Attitude Related Indicators	
Perceived Opportunities	Not efficient
Perceived Capabilities	Basically efficient
Fear of Failure	Sufficient obstacle
Entrepreneurial Intention	Not efficient
Know Startup Entrepreneur Rate	Not efficient
High Status Successful Entrepreneurship	Not efficient
Entrepreneurship as Desirable Career	Not efficient
Media Attention for Entrepreneurship	Not efficient
Activity Related Indicators	
Informal Investors Ratio	Not efficient
Discontinuity of Business	Relatively low TEA

With the exception of perceived capabilities, given the level of other indicators, Japan's TEA is low. That is, entrepreneurship related indicators' contribution to TEA is not efficient. Fear of failure may thus be a sufficient obstacle. However, we must acknowledge that Takahashi etal.'s (2013) conflicting results for perceived opportunities and know startup entrepreneur rateis more convincing for the same reason. The inefficient utilization of other factors could explain Japan's low TEA. That is, if these factors were used more efficiently, Japan's TEA would be higher.

The results of Tables 10 and 11 suggest that more efficient utilization of entrepreneurial intention, entrepreneurial network, media attention, and informal investors' activity could efficiently contribute to increasing Japan's

TEA and activating entrepreneurial activity.

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